

**Remarks:**

Applicant has carefully studied the non-final Examiner's Action mailed 09/12/2006, having a shortened statutory period for response set to expire 12/12/2006, and all references cited therein. The amendment appearing above and these explanatory remarks are believed to be fully responsive to the Action. Accordingly, this important patent application is now believed to be in condition for allowance.

Applicant responds to the outstanding Action by centered headings and numbered paragraphs that correspond to the centered headings and paragraphing employed by the Office, to ensure full response on the merits to each finding of the Office.

**Objection**

The first paragraph of the specification stands objected to on the grounds that the claim of §371 status should instead be a claim of §111(a) status. Applicant respectfully traverses this ground of objection because this is a §371 national entry under the Patent Cooperation Treaty and is not a §111(a) patent application.

Claim 26 stands objected to because the limitation in line 4 "a is used" should be "area is used." Applicant's copy of the application as electronically filed indicates that "area is used" appears in the original application as electronically filed; thus it appears that some letters were lost in the electronic transmission. Accordingly, said claim 26 is first amended without the use of "Track Changes" to duplicate the file as received by the Office, and said altered text is then amended with "Track Changes" to meet the objection.

**Specification**

The first sentence of paragraph 0007 stands objected to as being incomplete. Said first sentence is amended herewith and is now believed to be complete.

Paragraph 21 stands objected to because it mixes the terms "optically" and "electrically." Said paragraph is amended herewith to remove the ambiguity.

Paragraph 0034 stands objected to because it includes the grammatically incorrect term "fairly lowlaser source." Applicant's copy of this electronically-filed patent application does not include the quoted subject matter. Thus it is believed that the error is a transmission error. Applicant has corrected paragraph 0034 by deleting the material not received by the Office, and re-inserting said material as if it were new material. No new matter is thereby introduced.

Paragraph 0037 stands objected to as being incomplete. Applicant's copy of said electronically filed paragraph as transmitted reads as follows:

"Optical bandpass filter 28 may also be used to pass preselected wavelengths and reject interfering light impinging on detector 20."

The Office is requested to complete paragraph 0037 as received by means of examiner's amendment because Applicant does not know what part of said paragraph was received by the PTO during the flawed electronic filing of this application.

Paragraph 0043 stands objected to because it includes the grammatically incorrect term "pointcommunication" The grammatical error also appears in Applicant's copy and is corrected herewith.

Paragraphs 0015 and 0042 stands objected to because it includes the incorrect term "a # to 2 # steradians." Again, Applicant's copy does not reflect this error. The incorrect terms are therefore introduced without markings into said paragraphs and then the incorrect term is corrected in both paragraphs to "a  $\pi$  to 2  $\pi$  steradians."

#### *Claim Rejections – 35 U.S.C. § 112*

Applicant acknowledges the quotation of the first and second paragraphs of 35 U.S.C. §112.

Claims 20-24, 26-27, 29 and 32-33 stand rejected under 35 U.S.C. 112, first paragraph, because the specification does not adequately teach how to transmit data using a LIDAR beam.

Applicant respectfully traverses this rejection. In this invention, LIDAR transmits either a pulsed or CW (continuous wave) narrow laser beam that is backscattered from a distant target (such as hard targets or soft targets such as clouds, atmospheric molecules, or aerosols). A telescope and optical detector sense the backscattered light. The range to the target is determined by the transit time to the target and back. Information about the chemical composition of the target or atmosphere is deduced from differential absorption, Raman, or fluorescence optical spectroscopic changes in the backscattered LIDAR returns. For example, the speed of the target is determined from the Doppler shift of the backscattered light. Chemical concentrations of gases in the atmosphere are determined from the absorption of selected wavelengths of the LIDAR laser as the laser beam is transmitted through the air. Remote bacteria can be detected from

unique optical fluorescence given off by the bacteria target. The composition of powders can be detected and analyzed based upon the Raman shifted backscattered LIDAR returns.

In all prior art inventions involving LIDAR lasers, the laser beam is not modulated to transmit information. If it is modulated (either in amplitude or wavelength or optical frequency) it is to enhance the LIDAR determined signal of chemical composition, Doppler speed, target distance. LIDAR has never been used in the prior art to transmit telecommunication signals.

The systems of LIDAR and laser communication are similar in laser/telescope/optical detector design, so that the spatial beam steering and backscatter characteristics of a LIDAR system could also be used for a laser communication system. The use of a LIDAR is therefore not critical. The term LIDAR was employed merely to simplify the understanding and description of the novel system.

A LIDAR system can easily be used to transmit and convey telecommunication information through amplitude modulation and even frequency or wavelength modulation of the LIDAR laser. This is the telecommunication principal used in the laser communication system disclosed in Drake. A LIDAR system can also be used to transmit telecommunication information such as video or internet or radio, in the same way that a radio carrier wave transmits information through modulation of the carrier. For a LIDAR telecommunication system, the laser light is modulated in amplitude (AM) or frequency (FM).

One of ordinary skill in the art would therefore know how to transmit data using a LIDAR beam without undue experimentation, employing the well-known methods of amplitude and frequency modulation. See [http://www.ghcc.msfc.nasa.gov/sparcle/sparcle\\_tutorial.html](http://www.ghcc.msfc.nasa.gov/sparcle/sparcle_tutorial.html) where it is explained that a LIDAR operates much like a RADAR but the radio waves of a radar are replaced by radiation in the visible light spectrum. Patent applications are addressed to those of ordinary skill in the art so it was not required of Applicant to expressly state that a LIDAR beam is amplitude or frequency modulated to transmit data.

Claims 12-17 and 20-24, 26-27, 29 and 30-33 stand rejected under 35 USC 112, second paragraph, as being indefinite.

Claims 12-17 include the limitation "having a # to 2 # steradians." This ground of rejection is overcome in said claims as currently amended. However, Applicant's copy of the electronically filed application does not contain the error that appears in the Office's copy so the

error appears to have been made by the electronic filing system operated by the Office. Applicant has therefore added the error to the claims in order to correct said error.

Claims 30 and 32 recite the limitation "an optical communication," which limitation lacks antecedent basis in the specification. The complete limitation is "an optical communication signal" so said claims are amended herewith to recite the limitation of an optical signal which limitation has antecedent basis in the specification.

Claims 31 and 33 recite the limitation "a common optical communication." The complete limitation is "a common optical communication signal" so said claims are amended herewith to recite the limitation of a common optical signal which limitation has antecedent basis in the specification.

Claims 20-24, 26-27, 29, and 32-33 recite the transmission of data using a LIDAR beam. This issue has been cleared up by Applicant's above remarks.

***Claim Rejections – 35 U.S.C. § 102***

Applicant acknowledges the quotation of 35 U.S.C. § 102(b).

Claims 18 and 20 stand rejected under 35 U.S.C. § 102(b) as being anticipated by Drake. Applicant does not traverse this ground of rejection. Claim 18 (relating to a generic laser) is amended by canceling claim 28 and adding the subject matter thereof to claim 18. Claim 19 (relating to a LIDAR laser) is amended by canceling claim 29 and adding the subject matter thereof to claim 19. Claims 18 and 20, currently amended, now recite that modulated light from a laser source are aimed at different multiple external remote targets and target spatial regions to separate spatially different optical signals from one another. Drake and all other references are silent on this important teaching.

***Claim Rejections – 35 USC § 103***

Applicant acknowledges the quotation of 35 U.S.C. § 103(a).

Claims 20-22 and 24-27 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Drake in view of Durant et al. (hereinafter "Durant.") and Geiger. Although Geiger clearly teaches a DIAL LIDAR system that measures atmospheric targets, it does not teach that modulated light from a DIAL LIDAR system can be aimed at different multiple external remote targets and target spatial regions to separate spatially different optical signals from one another. This is Applicant's teaching, and Drake as modified by Geiger is silent on this teaching.

With respect to claims 24-27, claims 24 and 25 depend from independent claim 18, currently amended, and are therefore allowable as a matter of law upon allowance of said claim 18. Moreover, claims 26-27 depend from independent claim 20, currently amended, and are therefore allowable as a matter of law upon the allowance of said claim 20.

With respect to claims 21 and 22, said claims depend from independent claim 20, currently amended, and are therefore allowable as a matter of law upon the allowance of said claim 20. Durant is silent on the subject matter of modulated light from a laser source being aimed at different multiple external remote targets and target spatial regions to separate spatially different optical signals from one another.

Claims 1, 2, 6, 10, 11, 19 and 23 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Drake in view of Onaka et al. (hereinafter "Onaka."). The cancellation of claim 11 renders moot this rejection as it relates to said claim. Reconsideration and withdrawal of this ground of rejection as it relates to claims 1, 2, 6, 10, 19 and 23 is requested because neither Drake nor Osaka suggest Applicant's teaching of modulated light from a laser source that is aimed at different multiple external remote targets and target spatial regions to separate spatially different optical signals from one another.

With respect to claims 19 and 23, said claims depend from independent claims 18 and 20, respectively, and are allowable as a matter of law upon the allowance of said independent claims.

With respect to claims 2, 10, and 11, claim 2 depends from independent claim 1, currently amended, and is allowable as a matter of law upon the allowance of said claim 1. Claim 10 depends from independent claim 6, currently amended, and is allowable as a matter of law upon the allowance of said claim 6. Claim 11 stands cancelled as aforesaid.

Claims 1, 6, 3-5, 7-9 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Ohshima et al. (hereinafter "Ohshima") in view of Onaka. The cancellation of claims 7-9 renders moot this ground of rejection as it relates to said claims. Reconsideration and withdrawal of this ground of rejection as it relates to claims 1, 6, and 3-5 is requested because independent claims 1 and 6 now recite that at least one optical light source (claim 1) or a laser source (claim 6) are aimed at different multiple external remote targets and target spatial regions. Neither Ohshima nor Onaka teach or suggest this important structural aspect of Applicant's invention.

With respect to claim 1, Ohshima teaches a system aimed at a single target and thus Ohshima fails to teach a system for aiming at least one optical light source at different multiple

external remote targets and target spatial regions. Onaka teaches multiple wavelengths but also fails to teach a system for aiming at least one optical light source at different multiple external remote targets and target spatial regions.

With respect to claim 6, the combination of Ohshima and Onaka cannot teach or suggest what they individually fail to teach or suggest.

With respect to claims 3 and 8, said claims depend from independent claims 1 and 6, respectively, and are allowable as a matter of law upon allowance of said independent claims.

With respect to claims 4 and 7, said claims depend from independent claims 1 and 6, respectively, and are allowable as a matter of law upon allowance of said independent claims.

With respect to claims 5 and 9, said claims depend from independent claims 1 and 6, respectively, and are allowable as a matter of law upon allowance of said independent claims.

Claims 12-17 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Ohshima and Onaka as applied to claims 1 and 6, and further in view of Savicki. This rejection is rendered moot by the cancellation of said claims.

With respect to claims 13 and 16, cancellation of said claims renders moot this ground of rejection.

With respect to claim 14, cancellation of said claim renders moot this ground of rejection.

With respect to claims 15 and 17, cancellation of said claims renders moot this ground of rejection.

Claims 28, 29, 30, 31, 32 and 33 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Drake in view of *Wireless In-House Data Communication Via Diffuse Infrared Radiation* (hereinafter “*Wireless In-House*”); reconsideration and withdrawal of this ground of rejection is requested because Drake and *Wireless In-House* both fail to teach or suggest different multiple external remote targets and target spatial regions. The multiple targets in *Wireless In-House* are neither external nor remote and the in-house environment of the *Wireless In-House* system teaches away from the invention. Telescopes lack utility in an in-house environment and it would not have been obvious at the time the claimed invention was made to incorporate the telescopes of Drake into the system disclosed in *Wireless In-House*.

New claim 34 is drawn to a communication device where an external remote target includes atmospheric aerosols (Mie backscatter) and atmospheric molecules (Rayleigh backscatter) that are in line-of-sight relation to the optical light source and the detector. New

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claim 35 depends from new claim 34 and adds that the external remote target includes a plurality of external remote targets in the form of multiple atmospheric backscatter spatial target regions. New claim 36 depends from claim 1 and adds a plurality of external remote targets including atmospheric backscatter in non-line-of-sight relation to the detector where the detector is adapted to detect multipath backscatter from the multiple backscatter spatial target regions.

*Related Prior Art*

Applicant agrees that the art made of record and not relied upon is not more pertinent to the claimed invention than the art cited.

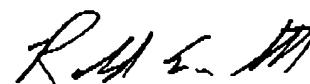
*Conclusion*

A Notice of Allowance is solicited. If the Office is not fully persuaded as to the merits of Applicant's position, or if an Examiner's Amendment would place the pending claims in condition for allowance, a telephone call to the undersigned at (813) 925-8505 is requested. Applicant thanks the Office for its careful examination of this important patent application.

Very respectfully,

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Dated: December 12, 2006

cc: Dennis K. Killinger, Ph. D.  
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CERTIFICATE OF FACSIMILE TRANSMISSION  
(37 C.F.R. 1.8)

I HEREBY CERTIFY that this Amendment A, including Introductory Comments, Amendments to the Specification, Amendments to the Claims, and Remarks, is being transmitted by facsimile to the United States Patent and Trademark Office, Central Fax, Attn: Ralph Jean Bart, (571) 273-8300 on December 12, 2006.

Dated: December 12, 2006

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April Turley